

From: [Risher, John \(ATSDR/DTEM/ATB\)](#)
To: [Nickle, Richard \(ATSDR/DTEM/PRMSB\)](#); [Robert Safay/R4/USEPA/US@EPA](#)
Cc: [Durant, James T. \(ATSDR/DTEM/PRMSB\)](#); [Olivares, Dagny \(ATSDR/OC\)](#); [Holler, James S. \(Jim\) \(ATSDR/DTEM/PRMSB\)](#); [Patrick Young/R6/USEPA/US@EPA](#); [Murray, Ed \(ATSDR/DTEM/OD\)](#); [Fowler, Bruce \(ATSDR/DTEM/OD\)](#); [George Pettigrew/R6/USEPA/US@EPA](#)
Subject: RE: Draft Fact sheet
Date: 04/27/2010 10:22 AM

Rich,

Again, and as usual, your discussion is both well-informed and appropriate. I just want to throw in my two cents (about what it's worth) related, but separate, issue.

People need to be aware of the fact that certain smells can evoke nausea, and sometimes vomiting. And yet the chemical(s) causing the smell can be at non-toxic levels. There is an area in our brainstem called the chemoreceptor trigger zone (CTZ, or vomiting trigger zone). Some chemicals, such as pharmaceuticals, can act directly on CTZ receptors and cause nausea, sometimes severe. There are also areas in the midbrain, such as the habenular nucleus, that cause emotional responses to odors, and then pass the signal to the CTZ.

I was once at an old coal gasification site in Iowa during its remediation. Discarded chemicals were buried from just below the surface to a depth of 30 feet. The children just across the street from the site vomited when they came outside and smelled the foul scent. There were no chemicals in the air at potentially toxic levels, but the vileness of the smell itself evoked the vomiting response. At autopsies, some people place Vick's vaporub or other strongly smelling substances on their upper lip to avoid the nausea caused by the smell of decomposing flesh. At the first autopsy I ever attended, several people became nauseated and had to leave based solely on the post-mortem examination procedures themselves. Their response was unpleasant, but certainly not due to any toxicity.

My point is not in exception to your efforts, but is just intended to point out that it is not necessarily toxicity that causes nausea and vomiting. And that raises the question of whether an adverse effect is being evoked, vs. a toxic effect. I personally have never been fond of emesis.

John

From: Nickle, Richard (ATSDR/DTEM/PRMSB)
Sent: Tuesday, April 27, 2010 10:54 AM
To: 'Safay.Robert@epamail.epa.gov'
Cc: Durant, James T. (ATSDR/DTEM/PRMSB); Olivares, Dagny (ATSDR/OC); Holler, James S. (Jim) (ATSDR/DTEM/PRMSB); Young.Patrick@epamail.epa.gov; Murray, Ed (ATSDR/DTEM/OD); Risher, John (ATSDR/DTEM/ATB); Fowler, Bruce (ATSDR/DTEM/OD); Pettigrew.George@epamail.epa.gov
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I thought I answered that in the second question; we need to set some of the basis for the answer which I tried to do in the first question and answer. Most of the information below is not suitable for a fact sheet or better presented by someone else in the JIC.

From the characteristics of oil found in other wells in the same area (NOAA is focusing on data from a well in Mississippi Canyon Block 72 as the closest location physically to the spill site, but their ADOIS model has data from two

other wells in the same Mississippi Canyon areas of leases), this mixture should behave very much like a heavy fuel oil. I think we can use #4 Diesel discussed in our Tox Profile as a surrogate. The odor threshold for #4 diesel, according to the Tox Profile, is about 0.5 ppm. In general, the no effect levels for fuel oils – and under our assumptions this grade of crude - is in the range of about 400 ppm. The make-up of oil from all of the wells in the areas that we know about indicates crude from this field contains little or no benzene or sulfides. Most of the wells contain about 25-30% aromatics like toluene and 70% saturated hydrocarbons with little or no paraffins. So we are probably looking at mostly straight chain hydrocarbons in the C-8 and higher range; most hydrocarbons like that are relatively non-toxic to humans. Data from the NOAA models indicate that most of the light ends will evaporate and disperse within 12-18 hours with the remainder gone in the first day; I added a day in the fact sheet. About 50% of the oil will persist as a liquid and the rest (10-20%) will either emulsify or disperse into the water column. The dispersants will increase the amount of liquid that is dispersed into the water column, but dispersants don't work well on heavier oils and emulsified oil. So, it seems possible that something pretty close to half of the oil coming out of this wellhead is going to survive to reach wherever it is going. After the time at sea, it will probably be in the form of tar balls or larger tar mats.

The problem is all of that is based on other mixtures and surrogates that we think are comparable to this oil, but we have no actual data on this particular product yet to confirm what we think. The Mississippi Canyon Block of leases covers a good chunk of the Gulf of Mexico starting about 30 miles offshore and extending out to 200 miles and from the Mississippi River Delta to roughly due south of Fort Walton Beach, FL. Everything that is happening so far is consistent, but there could be differences because the crude oil may be different from our surrogates. There may also be people more sensitive to the substances than others. The exposure durations to the odors and the substances in the oil may be longer than is usual for more routine oil spills because of the time it could take to stop the release.

Data from other crude oil spills that James found on Medline late yesterday indicate headaches seem to be the first and most consistent symptom of exposure and they may persist for several weeks after the oil is cleaned up before they dissipated. Women appear to be more sensitive to the effects than men. There are other less consistent effects of exposure in the literature, including reports of persistent respiratory effects among residents in villages

near the spills. Most of those events involved lighter crude oils than we seem to have here, which may mean those health effects are associated with the lighter ends not a part of this mixture. The NIOSH HHE from the Exxon Valdez workers did not find any health effects that could be attributed to the spill amongst the workers; the air concentrations reported during that spill were minimal (in the low-to-mid ppb range). Exceptions were from worksites out on the water near the “fresher” oil. In one test NIOSH did looking at dermal exposure of a small number of workers and controls, the concentrations detected on the workers were comparable to the controls. In addition, concentrations detected on the workers were higher before and after their workshift indicating the method was picking up soaps and other cleaners. There isn't enough data in that dermal test to draw any generalizable conclusions, but it is promising. North Slope crude like that found on Exxon Valdez is a lighter crude with almost 3% benzene in the mixture compared to what is found in Mississippi Canyon.

The bottom line is that we don't know for certain that the odor won't make people sick, but the probabilities are that it won't. If it does, any effects will likely be transient after the cleanup is complete. That's why I said in the second question about the air pollution something like the concentration reaching shore is most likely above the level where we can smell it, but lower than the amount that can harm us. Then I added the sentence about how to reduce any exposure to the odor.

I don't know that we have the data to go further than that. If that is a problem, we need to talk.

Rich Nickle

ATSDR Emergency Response

From: Safay.Robert@epamail.epa.gov [mailto:Safay.Robert@epamail.epa.gov]
Sent: Tuesday, April 27, 2010 8:21 AM
To: Nickle, Richard (ATSDR/DTEM/PRMSB); Young.Patrick@epamail.epa.gov; Pettigrew.George@epamail.epa.gov
Cc: Durant, James T. (ATSDR/DTEM/PRMSB); Olivares, Dagny (ATSDR/OC); Holler, James S. (Jim) (ATSDR/DTEM/PRMSB); Murray, Ed (ATSDR/DTEM/OD); Risher, John (ATSDR/DTEM/ATB); Fowler, Bruce (ATSDR/DTEM/OD)
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Rich, I think the first item we need to address is odor. The complaints coming in are about odor, is it harmful? Am I going to get sick? Bob

From: "Nickle, Richard (ATSDR/DTEM/PRMSB)" [ran2@cdc.gov]

Sent: 04/26/2010 04:35 PM AST

To: Robert Safay; Patrick Young; George Pettigrew

Cc: "Durant, James T. (ATSDR/DTEM/PRMSB)" <hzd3@CDC.GOV>; "Olivares, Dagny (ATSDR/OC)" <dvp2@cdc.gov>; "Holler, James S. (Jim) (ATSDR/DTEM/PRMSB)" <jsh2@CDC.GOV>; "Murray, Ed (ATSDR/DTEM/OD)" <hem0@CDC.GOV>; "Risher, John (ATSDR/DTEM/ATB)" <jzr8@CDC.GOV>; "Fowler, Bruce (ATSDR/DTEM/OD)" <bxf9@CDC.GOV>

Subject: Draft Fact sheet

OK, here is a *very very very* rough cut of a fact sheet to address the requests from your region. I think some of it is way too long, but it is one page front and back. It is usually easier to cut than to add. We need to fine tune the science to make sure what we think is what is real. The basic concepts came from the ToxFAQs and some site specific info I found at NOAA. Hopefully, John, James, Jim, and Bruce can help with critical reviews on the science and perhaps Dagny with language, tone, and format? My big concern at this point is whether the topics are comprehensive enough given that this will get mixed – and, like as not, matched – with other agency's info at the Joint Information Center to complete the whole picture for the public.

Anyway, take a look and let me know.

Rich Nickle

ATSDR Emergency Response

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